

## **EAGLE 2006 – Soil Moisture Field Observations over the Cabauw Grassland**

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An extensive set of ground-based measurements is carried out in the framework of the EAGLE2006 Campaign. Field observations were performed with basically two objectives in mind. First of all they were used as radiometric reference measurements of different surface types for calibration and validation of remotely sensed air-borne and space-borne observations and as such they were performed simultaneously to the image acquisitions. Secondly, the field observations were carried out for the retrieval of biogeophysical parameters. Depending on surface type and surface characteristic the measurements took place from towers or on the ground. Soil moisture was measured in the field for calibration and validation of soil moisture measurements through remotely sensed data, which have been acquired during the campaign. The measurements were carried out on the Cabauw grassland site and took place during the entire day on 8, 12, 13, 14, and 15th of June 2006. Basically two different measurement techniques were employed. The Hydra Probe (Stevens Water Monitoring Systems Inc.) performs high frequency electrical measurements which are directly related to simultaneous measurement of soil moisture. Hydra Probe provides output of data in water fraction by volume. More information on this device is available on:

<http://www.stevenswater.com/catalog/> In addition gravimetric measurements were done by taking soil samples by augering in soil rings. Then, the samples were taken to the laboratory to carry out the measurements. In the laboratory, soil moisture was first measured gravimetrically by weighing the wet volume of soil, oven drying at 105 °C, and then re-weighing. The difference in mass corresponds to the mass of water then gravimetric water content of the soil can be determined. Using known water density, volumetric water can also be determined. The points of measurements were distributed in the four fields and marked with numbered sticks to repeat the measurements in the same position every time. The exact locations of the points were taken via the GPS station so as to reference them to the satellite images and airborne data. Sampling took place once a day, where the approximate distance between the points was 20-30 meters. The sampling was carried out at two depths; one at 5 cm and another one at 10 cm depth. There is no need for processing the soil moisture measurements from the hydra probe, since they are straight forward and ready to use. The gravimetric method needs some laboratory work which already has been done and the results are ready to use for calibrating the image data.